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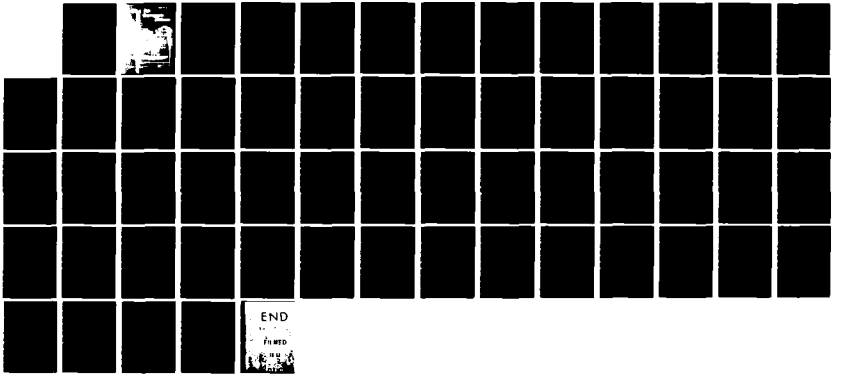

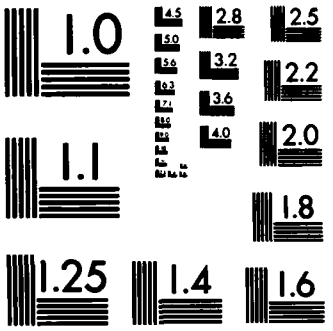

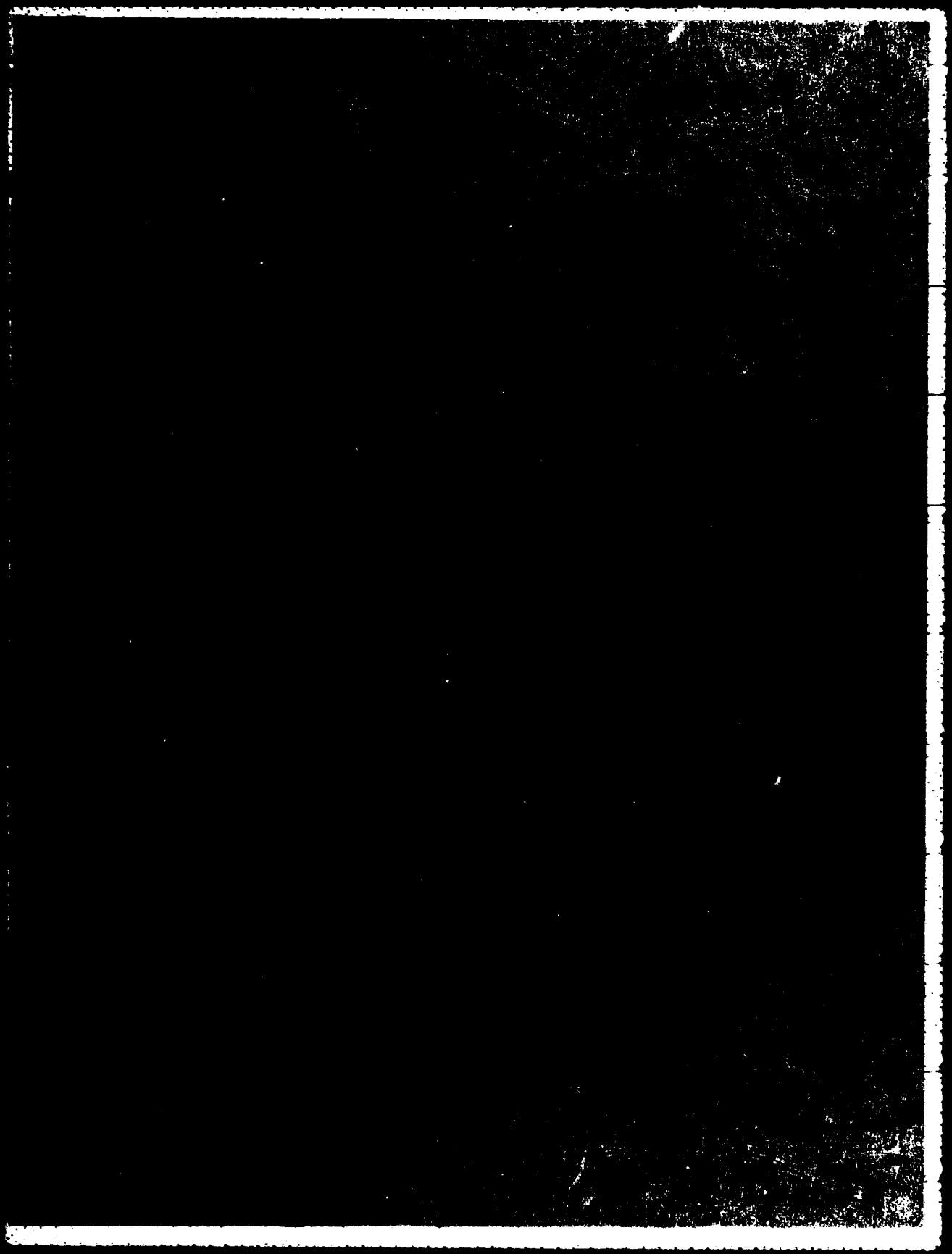

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ABSTRACT

Particulate matter samples were collected using free-drifting sediment traps in the Peru upwelling area in 1978 to assess the vertical flux and organic composition of lipids associated with particles sinking out of the euphotic zone. Samples have been analyzed for a variety of lipids, including hydrocarbons, fatty acids, wax esters, steryl esters, triacylglycerols, alkyldiacylglycerols, fatty alcohols, sterols, and steroid ketones. The purpose of this report is to collate the fatty acid and fatty acid ester (wax ester, steryl ester, triacylglycerol, and alkyldiacylglycerol) for the 20 floating sediment traps which were deployed.

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Fatty Acids And Fatty Acid Esters of Particulate Matter Collected in Sediment Traps in the Peru Upwelling Area R/V KNORR Cruise 73, February/March 1978

by

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September 1983

Technical Report

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Particulate matter samples were collected using free-drifting sediment traps in the Peru upwelling area in 1978 to assess the vertical flux and organic composition of lipids associated with particles sinking out of the euphotic zone. Samples have been analyzed for a variety of lipids, including hydrocarbons, fatty acids, wax esters, steryl esters, triacylglycerols, alkyldiacylglycerols, fatty alcohols, sterols, and steroid ketones. The purpose of this report is to collate the fatty acid and fatty acid ester (wax ester, steryl ester, triacylglycerol, and alkyldiacylglycerol) for the 20 floating sediment traps which were deployed.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

Organic geochemical studies of marine particulate matter are important in understanding the carbon cycle in the oeans. Large, rapidly sinking particles produced primarily in the euphotic zone by biological processes dominate the vertical mass flux to the deep sea. As part of an investigation of the relationships between the organic matter composition of large particles and the biogeochemical processes in the water column, we have analyzed samples of particulate matter collected in sediment traps in the upwelling area off the coast of Peru near 15°S during February-March, 1978. The rationale for sampling the upwelling area is that organic compounds are biosynthesized in large quantities compared to most other marine environments, and thus tracing transformations of organic matter in the water column would be more readily achieved because of the higher concentrations involved.

The investigation of the biogeochemistry of organic matter in the coastal area off Peru is a coordinated effort by several groups. Included are studies of hydrocarbons, fatty acids, wax esters, steryl esters, triacylglycerols, fatty alcohols, sterols, long-chain ketones, steroid ketones, carotenoids, amino acids, and organic carbon and nitrogen flux in source organisms, large and small particles, and sediments (Henrichs, 1980; Staresinic, 1978; Staresinic et al., 1983; Staresinic, 1983; Lee and Cronin, 1982; Wakeham et al., 1983; Volkman et al., 1983; Gagosian et al., 1983a,b; Repeta, 1982; Repeta and Gagosian, 1983; Henrichs and Farrington, 1983; Henrichs et al., 1983). The overall objectives of these studies are: i) to examine the downward flux and composition of organic matter and specific organic compounds out of the euphotic zone and into deeper water; ii) to determine the temporal and spatial variations in flux and composition; iii) to investigate the relationship between biological processes in the upper part of the water column and the formation of sinking particles; and iv) to investigate the relation between particle flux and composition and accumulation of organic matter in the underlying sediments.

The purpose of this report is to collate the data obtained for analysis of the sediment trap particulate matter samples for total fatty acids and fatty acid derivatives, in particular wax esters, steryl esters, triacylglycerols, and alkyldiacylglycerols. A brief summary of the analytical methodology used is presented. The reader is referred to Wakeham et al. (1983) for an initial discussion of the data.

II. METHODS

Free-drifting sediment traps (FSTs) were deployed off the Peruvian coast near the Coastal Upwelling Ecosystems Analysis "C" transect at about 15°S (Figure 1) during February-March, 1978 on R/V KNORR Cruise 73/2. FST deployment data and particulate organic carbon (POC) and nitrogen (PON) flux data are given in Tables 1 and 2, respectively (Staresinic, 1978). Gagosian et al. (1980) have described hydrographic, nutrient, and primary productivity conditions during the cruise. The FSTs consisted of a pair of 41 cm diameter cylinders (0.26 m^2 total collecting area) as described in detail by Staresinic (1978; 1983); the rationale of using free-drifting traps as opposed to moored trap arrays has been discussed by Staresinic et al. (1978). In all, 18 sets of FSTs were deployed for organic geochemical studies in the active upwelling; two additional traps were deployed 50 km offshore out of the upwelling zone (Figure 1). Four sets of day/night-shallow/deep trap samples were collected to assess diel and depth variations in flux and organic matter composition. The FSTs were recovered after 8-12 hour deployments so no poisons were used to inhibit microbial spoilage. In addition, a series of sediment cores were collected during the cruise, and results for some lipid class analyses in the sediments are reported by Volkman et al. (1983). Amino acid data for FSTs and sediments have been described elsewhere by Lee and Cronin (1982) and Henrichs (1980), respectively, and Gagosian et al. (1983a,b) report FST and sediment sterol data.

Analysis

Following recovery of the FSTs, the collected particulate matter was split by a plankton splitter and an aliquot (38%-50%) was filtered onto precombusted

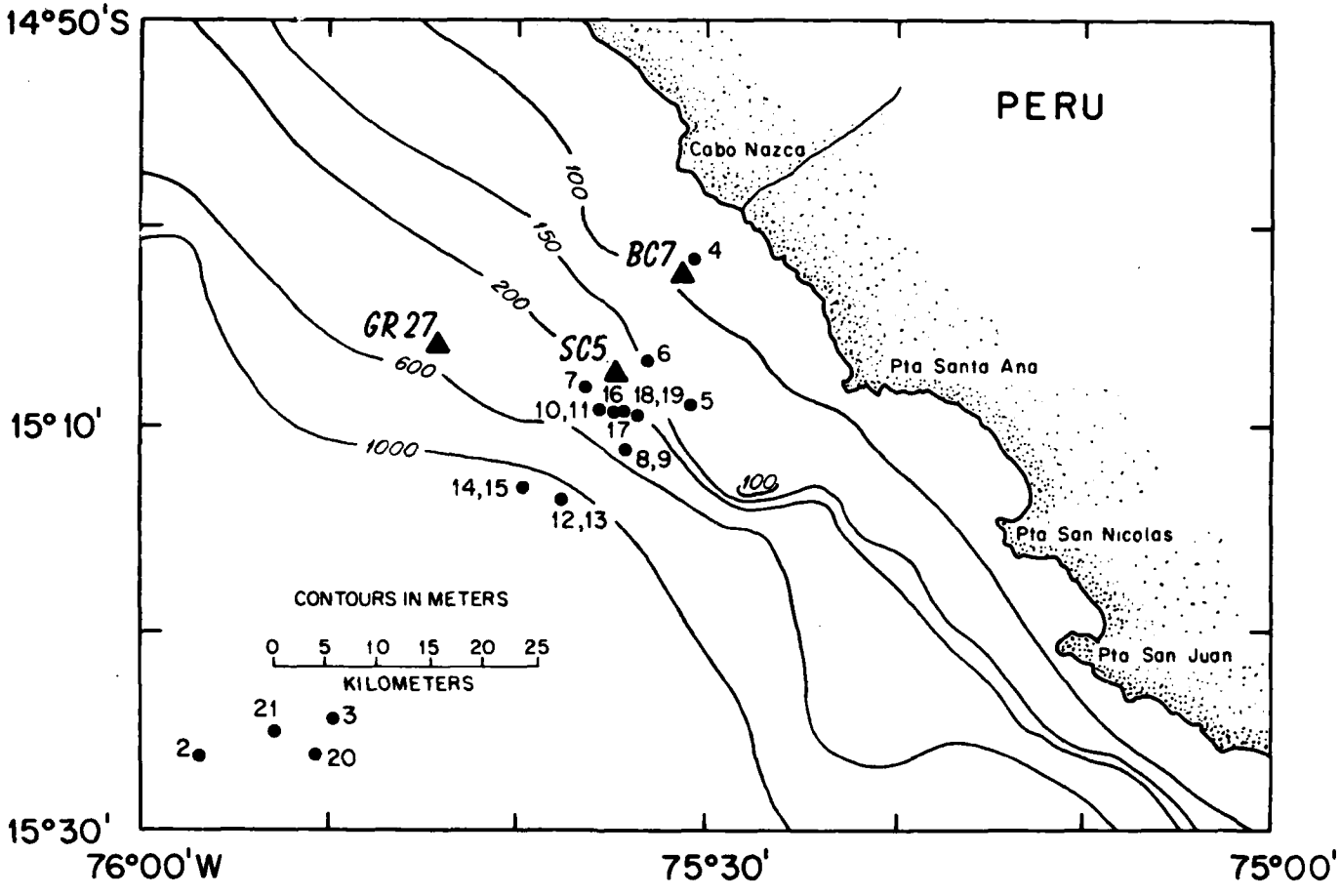

FIGURE 1

Locations of FST (●) Deployments and Sediment Samples (▲).

Table 1. FST Deployment Data (Staresinic, 1983).

FST Station	Date	Latitude (S)	Longitude (W)	Exposure Period (local time)	Deployment Depth (m)	Water Depth (m)
2	2/28	15°27.04'	75°57.7'	1000-1805	16	3600
3	2/28	15°26.06'	75°52.9'	2045-1000	--	3600
4	3/3	15°02.6'	75°31.3'	0926-1817	19	93
5	3/5	15°09.3'	75°31.3'	0913-1830	15	70
6	3/5,6	15°07.8'	75°33.9'	1924-1032	10	90
7	3/6	15°08.5'	75°37.0'	0925-1630	23	120
8	3/7	15°10.9'	75°34.5'	0840-1722	52	500
9	3/7	15°10.6'	75°34.6'	0830-1640	14	500
10	3/7,8	15°09.3'	75°36.2'	1955-0650	14	400
11	3/7,8	15°09.3'	75°36.3'	2105-0716	52	400
12	3/9	15°13.5'	75°37.2'	0912-1708	14	1000
13	3/9	15°13.3'	75°37.7'	0925-1625	53	1000
14	3/9,10	15°12.9'	75°39.3'	2200-0718	14	1000
15	3/9,10	15°12.9'	75°39.3'	2205-0648	53	1000
16	3/12	15°09.4'	75°35.1'	0850-1555	11	300
17	3/12	15°09.4'	75°34.6'	0904-1608	53	300
18	3/12,13	15°09.6'	75°34.3'	1930-0730	11	400
19	3/12,13	15°09.7'	75°34.2'	1948-0647	53	250
20	3/13	15°27.3'	75°51.3'	1045-2010	36	3800
21	3/13	15°26.0'	75°53.4'	1055-2035	53	3800

Table 2. Free-Drifting Sediment Trap POM Flux Data (Staresinic, 1983).

FST No.	FST Depth (m)	Downward Flux ($m^{-2}(12\ hr)^{-1}$) Dry Wt. (g)	POC (mg)	PON (mg)	C:N	POC / Dry Wt. %	Daily POC Flux (mg m^{-2} d^{-1}) Euphotic Depth	30 m	50 m	Primary Production (m^{-2} d^{-1})	% POC Flux : Production Euphotic Depth	30 m	50 m
4	19	3.79	260.4	31.2	8.4	6.9	520.8			5.30	9.8		
5	15	3.88	255.6	37.2	6.9	6.6							
							511.2			5.62	9.1		
6	10	2.86	255.6	48.0	5.3	9.0							
7	23	3.23	207.6	32.4	6.4	6.4	415.2			6.43	6.5		
9	14	2.93	164.4	22.6	7.3	5.6							
8	52	2.92	140.4	19.2	7.3	4.8							
							477.6		271.2	4.48	10.7		6.1
10	14	3.34	313.2	45.6	6.9	9.1							
11	52	2.48	130.8	14.4	9.1	5.3							
12	11	2.80	203.5	28.0	7.3	7.3							
13	53	3.02	165.5	20.4	8.1	5.5							
							546.7		238.8	3.59	14.8		6.7
14	11	3.61	343.2	63.6	5.4	9.5							
15	53	2.32	73.2	8.4	8.7	3.2							
16	11	4.23	224.4	30.0	7.5	5.3							
17	53	3.12	208.8	28.8	7.3	6.7							
							574.8		320.4	5.24	11.0		6.1
18	11	4.58	350.4	61.2	5.7	7.7							
19	53	2.50	111.6	12.0	9.3	4.5							
20	36	2.86	208.2	30.0	6.9	7.3							
							416.4		132.0	1.38	30.2		9.6
21	53	2.79	66.0	7.2	9.2	2.4							

glass fiber filters. The filters were immediately freeze-dried and stored frozen until extraction in the shore-based laboratory. The particulates and filters were exhaustively Soxhlet-extracted with toluene/methanol (1:1) and the lipids thus extracted partitioned into hexane. An aliquot of the hexane-soluble lipids (25%) was saponified with methanolic KOH, methylated with BF_3-MeOH, and the fatty acid methyl esters purified by silica gel adsorption chromatography (Merck silica gel 50, 5% deactivated with water). A second aliquot of the lipids (50%) was fractionated into constituent lipid class compounds by silica gel chromatography. Wax esters and steryl esters were eluted with 50% toluene in hexane and triacylglycerols and alkyldiacylglycerols were eluted by 10% ethyl acetate in hexane.

Fractions were analyzed by glass capillary gas chromatography on a Carlo Erba FTV Model 4160 gas chromatograph equipped with an on-column injector and a flame ionization detector. Compounds were separated on a 25 m x 0.3 mm i.d. silylated column coated with SE-52 (Grob, 1980). Fatty acid methyl esters were analyzed with a hydrogen carrier gas flow of 0.8 kg/cm^2 and a linear temperature program of 100-320°C at 3°/min. Intact wax esters and steryl esters were analyzed with hydrogen carrier at 1.5 kg/cm^2 and a program of 180-360° at 2°/min. Intact triacylglycerols and alkyldiacylglycerols were analyzed with hydrogen carrier at 2.0 kg/cm^2 and a program of 150-370° at 3.5°/min. The FID temperature was set at 350°C. Quantitation of GC peaks was obtained by electronic measurement of peak heights and areas using a Columbia Scientific Instruments Supergrator 3 and by comparison with internal and external standards.

Structural information was obtained by co-injection experiments with authentic standards and by capillary gas chromatography/mass spectrometry. Electron impact mass spectra of fatty acid methyl esters were obtained using a Varian Aerograph 1400 gas chromgtograph equipped with a 20 m x 0.3 mm i.d. SE-52 capillary column and interfaced with a Finnigan 1015C quadrupole mass spectrometer. Methane chemical ionization spectra of intact wax esters and steryl esters, and electron impact spectra of intact triacylglycerols and alkyldiacylglycerols were obtained using a Finnigan 9500 GC and a Finnigan 3200 quadrupole mass spectrometer; both the GC and MS were modified for high

temperature work as described by Wakeham and Frew (1982). Wax esters and steryl esters were separated on a SE-52 column (20 m x 0.3 mm i.d.) using helium carrier at 1.3 kg/cm^2 and a temperature program from 180-360° at 3°/min. Triacylglycerols and alkyldiacylglycerols were analyzed on a 15 m x 0.3 mm i.d. SE-30 capillary column with helium carrier at 0.75 kg/cm^2 and programmed from 250-370° at 4°/min. The glass capillary GC/MS interface was silylated and maintained at 370-380°C. Mass spectral data were acquired and processed using a Finnigan Incos Model 2300 data system.

III. PRESENTATION FORMAT

Data for the FSTs are summarized in Table 3. Total particulate matter (PM) and particulate organic carbon (POC) flux values are taken from Staresinic (1978, 1983). Lipid flux data are estimated from weights of lipid extracted, while flux data for total fatty acids (TFA), wax esters (WE), steryl esters (SE), triacylglycerols (TaG), and alkyldiacylglycerols (DaG) are sums derived from gas chromatographic analyses. Because day/night pairs of FSTs are compared, flux data are given in weight/m^2·12 hr.

In the tables which follow, flux data for fatty acids and fatty acid esters are listed in terms of carbon chain length (number of carbon atoms:number of double bonds). Steryl esters are designated as acyl carbon number/sterol moiety (e.g. $12/\Delta^{5,22}\text{-}C_{28}$ is methylcholesta-5,22-dien-3β-yl dodecanoate). Data in Table 3 have been rounded to a reasonable number of significant figures, while data in the tables following have not. Blanks indicate that a particular compound or chain length was not present at a readily quantifiable level. For the alkyldiacylglycerols, N.D. means that these compounds were not determined because their presence was not clearly demonstrated.

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Table 3. FST Data Summary

FST	Day/Night Depth (m)	PM[a,c] g/m^2·12 h	POC[a,c] mg/m^2·12 h	Lipid[b]	TFA[c]	WE[c]	SE[c]	TaG[c]	DaG[c]
					µg/m^2·12 h				
2	D, 16 m	--	--	43.4	10,200	670	30	1,130	--
3	N, --[d]	--	--	8.3	2,930	37	3	260	--
4	D, 19 m	3.79	260	27.1	7,240	34	12	920	--
5	D, 19 m	3.88	256	27.3	6,180	27	8.5	130	--
6	N, 10 m	2.86	256	7.7	1,990	28	7.9	130	23
7	D, 23 m	3.23	208	11.8	2,320	17	0.5	95	5.9
8	D, 52 m	2.92	140	14.7	2,700	81	6.8	160	--
9	D, 14 m	2.93	164	13.2	3,140	40	3.7	36	--
10	N, 14 m	3.34	313	75.3	24,400	840	230	600	200
11	N, 52 m	2.48	131	24.7	14,400	18	40	840	--
12	D, 11 m	2.80	204	39.3	13,200	32	58	1,110	--
13	D, 53 m	3.02	166	24.5	5,540	48	20	270	--
14	N, 11 m	3.61	343	117	20,600	150	53	870	140
15	N, 53 m	2.32	73	12.1	3,560	25	5.9	850	--
16	D, 11 m	4.23	224	80.6	31,400	130	28	310	--
17	D, 53 m	3.12	209	23.0	3,150	14	2.9	260	--
18	N, 11 m	4.58	350	53.7	14,400	230	19	530	95
19	N, 53 m	2.50	112	6.7	1,950	32	16	460	40
20	D, 36 m	2.86	208	17.9	5,060	230	256	250	--
21	N, 53 m	2.79	66	60	17,400	51	18	580	--

[a] Staresinic, 1978
[b] Gravimetric determination
[c] See text for abbreviations
[d] Data not available

Peru FST 2

PM Flux -
POC Flux -
Lipid Flux - 43.4 mg/m^2 12 hr

Day / Night
Depth 16 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	25.8	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	15.3	26:0	2.9	unk		
14:1	1.0	27:0	1.5	13	$\Delta^{5,22}C_{28}$	
14:0	1708.4	28:1		14	$\Delta^{5,22}C_{27}$	1.5
i 15:0	89.4	28:0	77.0	14	$\Delta^{5}C_{27}$	4.7
a 15:0	30.8	29:0	3.7	14	$\Delta^{5,22}C_{28}$	2.1
15:0	156.1	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	845.2	30:1	14.2	unk		
16:0	4890.0	30:0	35.2	unk		
i 17:0	33.2	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	14.7	32:2	66.4	15	$\Delta^{5,22}C_{28}$(?)	
17:1		32:1	45.6	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	70.5	15	$\Delta^{5}C_{27}$	0.4
18:2		33:1		16	$\Delta^{5,22}C_{27}$	4.1
18:1Δ^9	682.7	33:0	4.1	16	$\Delta^{5}C_{27}$	9.6
18:1Δ^{11}	284.5	34:2	212.2	14	$\Delta^{5,22}C_{29}$	
18:0	929.0	34:1	18.9	16	$\Delta^{5,22}C_{28}$	2.9
19:0	I.S.	34:0	8.8	16	$\Delta^{5,24(28)}C_{28}$	
20:5		35:1		16	$\Delta^{22}C_{28}$	
20:4		35:0		16	$\Delta^{5}C_{28}$	
20:1	121.4	36:2		16	$\Delta^{22}C_{29}$	
20:0	59.6	36:1	54.8	16	$\Delta^{5}C_{29}$	
21:0		36:0	6.0	17	$\Delta^{5,22}C_{27}$	
22:6	11.5	37:0	1.0	17	$\Delta^{5}C_{27}$	0.9
22:5		38:2		18	$\Delta^{5,22}C_{27}$	0.3
22:1	56.1	38:1	20.3	18	$\Delta^{5}C_{27}$	3.8
22:0	37.9	38:0	1.4	unk		
23:0	10.4	39:0		18	$\Delta^{5,22}C_{28}$	
24:1	102.9	40:2		18	$\Delta^{5}C_{28}$	
24:0	36.2	40:1	11.4	19	$\Delta^{5}C_{27}$	
25:0	3.1	40:0	1.7	18	$\Delta^{22}C_{29}$(?)	
26:1	18.9	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	10.7	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	1.0	42:1	11.8	20	$\Delta^{5}C_{27}$	0.1
28:0	2.7	42:0	1.5	22	$\Delta^{5}C_{27}$	
29:0	2.0	44:2		unk		
30:0	4.8	44:1				
		44:0		Total		30.4
Total	10,185.3					
		Total	670.9			

Peru FST 2

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	17.9		
43	6.5		
44	75.6		
45	20.4		
46	164.4	46e	
47	44.4		
48	225.6	48e	
49	56.4		
50	223.2	50e	
51	15.6		
52	200.4	52e	
53	5.4		
54	52.8	54e	
55	1.6		
56	15.6	56e	
57	0.8		
58	5.9	58e	
59			
60			
Total	1132.4	Total	N.D.

Peru FST 3

PM Flux -
POC Flux -
Lipid Flux - 8.3 mg/m^2 12 hr

Day / Night
Depth ____ m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	10.4	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	1.5	26:0	0.2	unk		
14:1	0.6	27:0	0.1	13	$\Delta^{5,22}C_{28}$	
14:0	312.8	28:1		14	$\Delta^{5,22}C_{27}$	0.1
i 15:0	26.2	28:0	1.3	14	$\Delta^{5}C_{27}$	0.3
a 15:0	6.7	29:0	0.3	14	$\Delta^{5,22}C_{28}$	
15:0	34.8	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	292.0	30:1	0.9	unk		
16:0	1352.5	30:0	4.1	unk		
i 17:0	20.9	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	5.7	32:2	1.3	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	1.4	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	5.1	15	$\Delta^{5}C_{27}$	0.1
18:2	29.1	33:1		16	$\Delta^{5,22}C_{27}$	0.4
18:1Δ^9	229.8	33:0	0.5	16	$\Delta^{5}C_{27}$	1.0
18:1Δ^{11}	122.3	34:2		14	$\Delta^{5,22}C_{29}$	
18:0	236.0	34:1	11.3	16	$\Delta^{5,22}C_{28}$	0.1
19:0	I.S.	34:0	1.8	16	$\Delta^{5,24(28)}C_{28}$	
20:5	35.1	35:1		16	$\Delta^{22}C_{28}$	
20:4	2.6	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	35.3	36:2		16	$\Delta^{22}C_{29}$	
20:0	25.8	36:1	3.4	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.6	17	$\Delta^{5,22}C_{27}$	
22:6	70.2	37:0	0.1	17	$\Delta^{5}C_{27}$	0.2
22:5	3.1	38:2		18	$\Delta^{5,22}C_{27}$	0.1
22:1	12.2	38:1	1.8	18	$\Delta^{5}C_{27}$	0.7
22:0	17.0	38:0	2.0	unk		
23:0	3.0	39:0		18	$\Delta^{5,22}C_{28}$	0.2
24:1	18.6	40:2		18	$\Delta^{5}C_{28}$	
24:0	13.1	40:1	1.0	19	$\Delta^{5}C_{27}$	0.02
25:0	4.3	40:0	0.1	18	$\Delta^{22}C_{29}$(?)	
26:1	3.7	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	3.7	42:2	0.2	20	$\Delta^{5,22}C_{27}$	0.02
27:0	0.6	42:1		20	$\Delta^{5}C_{27}$	0.1
28:0	0.6	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.6	44:2		unk		
30:0	0.6	44:1				
		44:0		Total		2.9
Total	2929.8					
		Total	37.3			

Peru FST 3

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	4.9		
41			
42	8.3		
43	1.6		
44	21.2		
45	4.7		
46	37.8	46e	
47	9.6		
48	51.4	48e	
49	9.1		
50	44.3	50e	
51	7.3		
52	29.4	52e	
53	5.6		
54	17.6	54e	
55	1.8		
56	4.4	56e	
57	1.3		
58	4.0		
59			
60			
Total	264.4	Total	N.D.

Peru FST 4

PM Flux - 3.79 g/m^2 12 h
POC Flux - 260.4 mg/m^2 12 h
Lipid Flux - 27.1 mg/m^2 12 hr

Day / Night
Depth 19 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	38.2	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	1.1	26:0	0.6	unk		
14:1	11.0	27:0	0.1	13	$\Delta^{5,22}C_{28}$	
14:0	842.3	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	61.0	28:0	2.7	14	$\Delta^{5}C_{27}$	0.7
a 15:0	19.1	29:0	0.3	14	$\Delta^{5,22}C_{28}$	
15:0	112.6	30:2	0.9	14	$\Delta^{22}C_{28}$	
16:1Δ^9	865.9	30:1	1.2	unk		
16:0	2621.7	30:0	4.0	unk		
i 17:0	50.4	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	13.2	32:2	1.5	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	1.3	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	3.7	15	$\Delta^{5}C_{27}$	0.1
18:2	91.8	33:1		16	$\Delta^{5,22}C_{27}$	0.4
18:1Δ^9	404.2	33:0	0.4	16	$\Delta^{5}C_{27}$	2.4
18:1Δ^{11}	352.2	34:2		14	$\Delta^{5,22}C_{29}$	
18:0	594.9	34:1	5.6	16	$\Delta^{5,22}C_{28}$	0.2
19:0	I.S.	34:0	1.3	16	$\Delta^{5,24(28)}C_{28}$	
20:5	426.0	35:1		16	$\Delta^{22}C_{28}$	
20:4	27.4	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	237.2	36:2		16	$\Delta^{22}C_{29}$	
20:0	41.4	36:1	4.2	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.5	17	$\Delta^{5,22}C_{27}$	
22:6	173.9	37:0	0.2	17	$\Delta^{5}C_{27}$	0.3
22:5	40.2	38:2		18	$\Delta^{5,22}C_{27}$	0.4
22:1	62.6	38:1	2.7	18	$\Delta^{5}C_{27}$	2.4/2.5*
22:0	44.3	38:0	0.9	unk		
23:0	8.8	39:0	0.3	18	$\Delta^{5,22}C_{28}$	
24:1	41.1	40:2		18	$\Delta^{5}C_{28}$	
24:0	27.9	40:1	0.5	19	$\Delta^{5}C_{27}$	0.1
25:0	4.1	40:0	0.4	18	$\Delta^{22}C_{29}$(?)	
26:1	8.0	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	11.3	42:2		20	$\Delta^{5,22}C_{27}$	1.1
27:0	1.0	42:1	0.2	20	$\Delta^{5}C_{27}$	1.0
28:0	3.8	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.4	44:2		unk		
30:0	1.6	44:1				
		44:0		Total		11.6
Total	7240.6					
		Total	33.8		*18:1/18:0	

Peru FST 4

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	4.8		
43	0.4		
44	10.1		
45	0.6		
46	13.3	46e	
47	1.2		
48	15.7	48e	
49	1.2		
50	15.0	50e	
51	0.7		
52	14.9	52e	
53	0.2		
54	13.8	54e	
55			
56		56e	
57			
58			
59			
60			
Total	92.3	Total	N.D.

Peru FST 5

PM Flux - 3.88 g/m^2 12 h
POC Flux - 255.6 mg/m^2 12 h
Lipid Flux - 27.3 mg/m^2 12 hr

Day / Night
Depth 19 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	216.3	26:1		12	$\Delta^{5,22}C_{28}$	
13:0		26:0	0.1	unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	655.7	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	287.9	28:0	0.9	14	$\Delta^{5}C_{27}$	0.5
a 15:0	13.1	29:0	0.3	14	$\Delta^{5,22}C_{28}$	
15:0	410.1	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	626.7	30:1		unk		
16:0	1894.3	30:0	2.3	unk		
i 17:0	25.2	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0		32:2	1.1	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	1.5	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	3.9	15	$\Delta^{5}C_{27}$	0.2
18:2		33:1		16	$\Delta^{5,22}C_{27}$	0.6
18:1Δ^9	255.8	33:0	0.3	16	$\Delta^{5}C_{27}$	1.7
18:1Δ^{11}	290.9	34:2	2.6	14	$\Delta^{5,22}C_{29}$	
18:0	173.7	34:1	3.0	16	$\Delta^{5,22}C_{28}$	0.7
19:0	I.S.	34:0	1.3	16	$\Delta^{5,24(28)}C_{28}$	
20:5	161.0	35:1		16	$\Delta^{22}C_{28}$	
20:4	4.0	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	139.4	36:2	1.6	16	$\Delta^{22}C_{29}$	
20:0	92.9	36:1	1.1	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.6	17	$\Delta^{5,22}C_{27}$	
22:6	167.3	37:0	0.3	17	$\Delta^{5}C_{27}$	1.1
22:5	18.5	38:2		18	$\Delta^{5,22}C_{27}$	0.8
22:1	163.5	38:1	2.8	18	$\Delta^{5}C_{27}$	2.0
22:0	168.7	38:0	0.6	unk		
23:0	30.7	39:0		18	$\Delta^{5,22}C_{28}$	0.6
24:1	71.1	40:2		18	$\Delta^{5}C_{28}$	
24:0	134.6	40:1	1.0	19	$\Delta^{5}C_{27}$	
25:0	11.1	40:0	0.3	18	$\Delta^{22}C_{29}$(?)	
26:1	81.2	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	47.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	27.6	42:1	1.1	20	$\Delta^{5}C_{27}$	0.3
28:0	1.8	42:0		22	$\Delta^{5}C_{27}$	
29:0	4.0	44:2		unk		
30:0	4.0	44:1				
		44:0		Total		8.5
Total	6178.7					
		Total	27.0			

Peru FST 5

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	2.9		
43			
44	8.8		
45	1.9		
46	22.1	46e	
47	5.5		
48	30.8	48e	
49	4.1		
50	16.2	50e	
51	1.9		
52	15.5	52e	
53			
54	16.0	54e	
55			
56		56e	
57			
58			
59			
60			
Total	125.6	Total	N.D.

Peru FST 6

PM Flux - 2.86 g/m^2 12 h
POC Flux - 255.6 mg/m^2 12 h
Lipid Flux - 7.7 mg/m^2 12 hr

Day / Night
Depth 10 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	0.5	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	0.5	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	242.0	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	25.3	28:0	1.5	14	$\Delta^{5}C_{27}$	1.2
a 15:0	6.4	29:0		14	$\Delta^{5,22}C_{28}$	0.3
15:0	30.8	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	126.2	30:1		unk		
16:0	1041.9	30:0	1.2	unk		
i 17:0	1.2	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	3.0	32:2	3.0	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	1.0	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	4.5	15	$\Delta^{5}C_{27}$	
18:2	48.3	33:1		16	$\Delta^{5,22}C_{27}$	0.8
18:1Δ^9	66.8	33:0	1.0	16	$\Delta^{5}C_{27}$	1.5
18:1Δ^{11}	57.3	34:2	2.7	14	$\Delta^{5,22}C_{29}$	
18:0	160.8	34:1	1.0	16	$\Delta^{5,22}C_{28}$	0.4
19:0	I.S.	34:0	1.7	16	$\Delta^{5,24(28)}C_{28}$	
20:5	3.3	35:1		16	$\Delta^{22}C_{28}$	
20:4		35:0	0.2	16	$\Delta^{5}C_{28}$	
20:1	38.9	36:2	2.4	16	$\Delta^{22}C_{29}$	
20:0	30.5	36:1	2.1	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.5	17	$\Delta^{5,22}C_{27}$	
22:6	7.7	37:0	0.2	17	$\Delta^{5}C_{27}$	0.9
22:5		38:2		18	$\Delta^{5,22}C_{27}$	0.5
22:1	5.2	38:1	2.2	18	$\Delta^{5}C_{27}$	1.6
22:0	35.5	38:0	0.2	unk		
23:0	4.2	39:0	0.1	18	$\Delta^{5,22}C_{28}$	0.3
24:1	20.0	40:2		18	$\Delta^{5}C_{28}$	
24:0	17.6	40:1	0.9	19	$\Delta^{5}C_{27}$	0.1
25:0	1.7	40:0	0.2	18	$\Delta^{22}C_{29}$(?)	
26:1	4.7	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	6.9	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	2.1	42:1	1.0	20	$\Delta^{5}C_{27}$	0.3
28:0	3.2	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.5	44:2		unk		
30:0	0.5	44:1				
		44:0		Total		7.9
Total	1993.6					
		Total	27.6			

Peru FST 6

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	3.0		
43	0.7		
44	12.8	44e	0.8
45	2.4		
46	31.3	46e	1.7
47	1.8		
48	31.8	48e	6.8
49	1.4		
50	15.2	50e	7.2
51			
52	13.4	52e	5.4
53			
54	15.8	54e	1.3
55			
56	1.3	56e	
57			
58			
59			
60			
Total	130.9	Total	23.3

Peru FST 7

PM Flux - 3.23 g/m^2 12 h
POC Flux - 207.6 mg/m^2 12 h
Lipid Flux - 11.8 mg/m^2 12 hr

Day / Night
Depth 23 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0		26:1		12	$\Delta^{5,22}C_{28}$	
13:0		26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	208.4	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	120.0	28:0	0.04	14	$\Delta^{5}C_{27}$	0.02
a 15:0	25.3	29:0		14	$\Delta^{5,22}C_{28}$	
15:0	60.0	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	146.7	30:1	0.05	unk		
16:0	952.5	30:0	0.1	unk		
i 17:0		31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0		32:2	1.2	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	0.6	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	3.4	15	$\Delta^{5}C_{27}$	
18:2		33:1		16	$\Delta^{5,22}C_{27}$	0.05
18:1Δ^9	144.7	33:0	0.1	16	$\Delta^{5}C_{27}$	0.2
18:1Δ^{11}	95.7	34:2	1.5	14	$\Delta^{5,22}C_{29}$	
18:0	114.9	34:1	0.7	16	$\Delta^{5,22}C_{28}$	0.03
19:0	I.S.	34:0	0.9	16	$\Delta^{5,24(28)}C_{28}$	
20:5		35:1		16	$\Delta^{22}C_{28}$	
20:4		35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	32.7	36:2	1.6	16	$\Delta^{22}C_{29}$	
20:0	37.1	36:1	0.6	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.5	17	$\Delta^{5,22}C_{27}$	
22:6	13.1	37:0		17	$\Delta^{5}C_{27}$	0.03
22:5		38:2	0.8	18	$\Delta^{5,22}C_{27}$	
22:1	203.6	38:1	1.5	18	$\Delta^{5}C_{27}$	0.1
22:0		38:0	0.4	unk		
23:0		39:0		18	$\Delta^{5,22}C_{28}$	
24:1	94.1	40:2		18	$\Delta^{5}C_{28}$	
24:0	46.2	40:1	1.5	19	$\Delta^{5}C_{27}$	
25:0		40:0	0.3	18	$\Delta^{22}C_{29}$(?)	
26:1		41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	37.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0		42:1	0.5	20	$\Delta^{5}C_{27}$	0.02
28:0		42:0		22	$\Delta^{5}C_{27}$	
29:0		44:2		unk		
30:0		44:1				
		44:0		Total		0.5
Total	2319.6					
		Total	16.6			

Peru FST 7

Triacylglycerols		Alkyldiacylglycerols	
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h
40			
41			
42	2.8		
43	0.6		
44	7.9		
45			
46	18.2	46e	
47	0.8		
48	21.8	48e	1.6
49			
50	13.0	50e	2.9
51			
52	14.4	52e	1.1
53			
54	12.8	54e	0.4
55			
56	2.2	56e	
57			
58			
59			
60			
Total	94.6	Total	5.9

Peru FST 8

PM Flux - 2.92 g/m^2 12 h
POC Flux - 140.4 mg/m^2 12 h
Lipid Flux - 14.7 mg/m^2 12 hr

Day / Night
Depth 52 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	47.4	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	0.4	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	348.6	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	8.7	28:0	3.5	14	$\Delta^{5}C_{27}$	0.8
a 15:0	4.7	29:0	0.2	14	$\Delta^{5,22}C_{28}$	
15:0	16.8	30:2	1.4	14	$\Delta^{22}C_{28}$	
16:1Δ^9	296.0	30:1	1.4	unk		
16:0	1429.3	30:0	4.4	unk		
i 17:0	3.6	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	3.9	32:2	4.9	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	6.4	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	6.8	15	$\Delta^{5}C_{27}$	0.1
18:2		33:1	1.8	16	$\Delta^{5,22}C_{27}$	0.5
18:1Δ^9	128.0	33:0	0.7	16	$\Delta^{5}C_{27}$	2.4
18:1Δ^{11}	97.2	34:2		14	$\Delta^{5,22}C_{29}$	0.5
18:0	237.4	34:1	30.2	16	$\Delta^{5,22}C_{28}$	
19:0	I.S.	34:0	2.4	16	$\Delta^{5,24(28)}C_{28}$	
20:5	2.3	35:1	1.2	16	$\Delta^{22}C_{28}$	
20:4	0.1	35:0	0.2	16	$\Delta^{5}C_{28}$	
20:1	12.3	36:2		16	$\Delta^{22}C_{29}$	
20:0	8.5	36:1	7.0	16	$\Delta^{5}C_{29}$	
21:0		36:0	1.0	17	$\Delta^{5,22}C_{27}$	
22:6	4.8	37:0	0.2	17	$\Delta^{5}C_{27}$	0.2
22:5		38:2	1.3	18	$\Delta^{5,22}C_{27}$	0.4
22:1	6.1	38:1	1.2	18	$\Delta^{5}C_{27}$	1.8
22:0	9.3	38:0	0.5	unk		
23:0	1.8	39:0	0.2	18	$\Delta^{5,22}C_{28}$	
24:1	5.3	40:2	0.5	18	$\Delta^{5}C_{28}$	
24:0	7.7	40:1	1.2	19	$\Delta^{5}C_{27}$	
25:0	2.8	40:0	0.04	18	$\Delta^{22}C_{29}$(?)	
26:1	2.7	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	3.9	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	3.3	42:1	0.4	20	$\Delta^{5}C_{27}$	0.1
28:0	7.7	42:0	0.2	22	$\Delta^{5}C_{27}$	
29:0	1.3	44:2		unk		
30:0	0.1	44:1				
		44:0		Total		6.8
Total	2694.5					
		Total	80.5			

Peru FST 8

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	2.4		
43			
44	13.2		
45	3.6		
46	37.2	46e	
47	4.8		
48	46.8	48e	
49	4.8		
50	19.2	50e	
51			
52	15.6	52e	
53			
54	10.8	54e	
55			
56		56e	
57			
58			
59			
60			
Total	158.4	Total	N.D.

Peru FST 9

PM Flux - 2.93 g/m^2 12 h
POC Flux - 164.4 mg/m^2 12 h
Lipid Flux - 13.2 mg/m^2 12 hr

Day / Night
Depth 14 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	7.9	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	1.3	26:0	0.6	unk		
14:1		27:0	0.1	13	$\Delta^{5,22}C_{28}$	
14:0	520.1	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	17.4	28:0	0.9	14	$\Delta^{5}C_{27}$	0.4
a 15:0	6.9	29:0	0.2	14	$\Delta^{5,22}C_{28}$	
15:0	45.2	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	199.5	30:1	1.4	unk		
16:0	1749.8	30:0	1.9	unk		
i 17:0	4.2	31:0	I.S.	14	$\Delta^{22}C_{29}$	
a 17:0	8.7	32:2	2.3	15	$\Delta^{5,22}C_{28}$	
17:1		32:1	1.6	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:0	8.0	15	$\Delta^{5}C_{27}$	0.2
18:2		33:1		16	$\Delta^{5,22}C_{27}$	0.5
18:1Δ^9	110.9	33:0	0.6	16	$\Delta^{5}C_{27}$	1.1
18:1Δ^{11}	72.5	34:2		14	$\Delta^{5,22}C_{29}$	0.2
18:0	285.8	34:1	10.0	16	$\Delta^{5,22}C_{28}$	
19:0	I.S.	34:0	1.2	16	$\Delta^{5,24(28)}C_{28}$	
20:5		35:1		16	$\Delta^{22}C_{28}$	
20:4		35:0	0.6	16	$\Delta^{5}C_{28}$	
20:1	5.6	36:2		16	$\Delta^{22}C_{29}$	
20:0	14.2	36:1	3.6	16	$\Delta^{5}C_{29}$	
21:0		36:0	1.0	17	$\Delta^{5,22}C_{27}$	
22:6	11.1	37:0	0.6	17	$\Delta^{5}C_{27}$	0.2
22:5		38:2		18	$\Delta^{5,22}C_{27}$	
22:1	9.5	38:1	1.7	18	$\Delta^{5}C_{27}$	1.0
22:0	22.4	38:0	0.8	unk		
23:0	4.3	39:0	0.2	18	$\Delta^{5,22}C_{28}$	
24:1	4.2	40:2		18	$\Delta^{5}C_{28}$	
24:0	7.5	40:1	1.2	19	$\Delta^{5}C_{27}$	
25:0	6.1	40:0	0.4	18	$\Delta^{22}C_{29}$(?)	
26:1	4.8	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	0.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	14.1	42:1	0.6	20	$\Delta^{5}C_{27}$	0.1
28:0	5.0	42:0	0.2	22	$\Delta^{5}C_{27}$	
29:0	3.1	44:2		unk		
30:0	1.2	44:1				
		44:0		Total		3.7
Total	3143.9					
		Total	40.3			

Peru FST 9

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	1.2		
43	0.4		
44	3.6		
45	0.4		
46	7.2	46e	
47	0.6		
48	8.4	48e	
49	0.6		
50	3.6	50e	
51			
52	4.8	52e	
53			
54	4.8	54e	
55			
56	0.6	56e	
57			
58			
59			
60			
Total	36.1	Total	N.D.

Peru FST 10

PM Flux - 3.34 g/m^2 12 h
POC Flux - 313.2 mg/m^2 12 h
Lipid Flux - 75.3 mg/m^2 12 hr

Day / Night
Depth 14 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12;0	97.8	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	2.8	26:0	3.8	unk		
14:1		27:0	1.6	13	$\Delta^{5,22}C_{28}$	
14:0	2590.3	28:1	3.7	14	$\Delta^{5,22}C_{27}$	4.1
i 15:0	88.5	28:0	38.4	14	$\Delta^{5}C_{27}$	19.6
a 15:0	19.6	29:0	6.8	14	$\Delta^{5,22}C_{28}$	1.7
15:0	165.2	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	4954.2	30:1	47.0	unk		
16:0	7865.0	30:0	104.4	unk		
i 17:0	131.8	31:1	6.4	14	$\Delta^{22}C_{29}$	
a 17:0	75.4	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2		15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	81.6	15	$\Delta^{5}C_{27}$	2.3
18:2	230.0	32:0	114.0	16	$\Delta^{5,22}C_{27}$	8.9
18:1Δ^9	3354.2	33:1	12.0	16	$\Delta^{5}C_{27}$	60.1
18:1Δ^{11}	1978.9	33:0	10.8	14	$\Delta^{5,22}C_{29}$	2.0
18:0	727.6	34:2	116.4	16	$\Delta^{5,22}C_{28}$	4.1
19:0	I.S.	34:1	39.6	16	$\Delta^{5,24(28)}C_{28}$	
20:5	2.5	34:0	44.4	16	$\Delta^{22}C_{28}$	
20:4	234.9	35:0	8.8	16	$\Delta^{5}C_{28}$	
20:1	1066.0	36:2	44.4	16	$\Delta^{22}C_{29}$	
20:0	407.3	36:1	12.8	16	$\Delta^{5}C_{29}$	
21:0		36:0	15.6	17	$\Delta^{5,22}C_{27}$	
22:6	186.8	37:0		17	$\Delta^{5}C_{27}$	7.3
22:5	7.6	38:2	28.8	18	$\Delta^{5,22}C_{27}$	6.2
22:1	94.2	38:1	31.2	18	$\Delta^{5}C_{27}$	63.9
22:0	8.7	38:0	7.2	unk		
23:0	4.4	39:0		18	$\Delta^{5,22}C_{28}$	3.4
24:1	56.9	40:2	40.8	18	$\Delta^{5}C_{28}$	
24:0	14.8	40:1	13.2	19	$\Delta^{5}C_{27}$	2.2
25:0	3.9	40:0	3.5	18	$\Delta^{22}C_{29}$(?)	
26:1	8.6	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	14.8	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	2.5	42:1	7.2	20	$\Delta^{5}C_{27}$	31.4
28:0	2.5	42:0	2.4	22	$\Delta^{5}C_{27}$	9.3
29:0	9.4	44:2		unk		
30:0	0.5	44:1				
		44:0		Total		226.5
Total	24,407.6					
		Total	843.1			

Peru FST 10

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	8.4		
43			
44	44.4		
45			
46	121.2	46e	
47			
48	152.4	48e	38.4
49			
50	99.6	50e	70.8
51			
52	79.2	52e	74.4
53			
54	55.2	54e	12.0
55			
56	20.4	56e	
57			
58	14.6		
59			
60			
Total	595.4	Total	195.6

Peru FST 11

PM Flux - 2.48 g/m^2 12 h
POC Flux - 130.8 mg/m^2 12 h
Lipid Flux - 24.7 mg/m^2 12 hr

Day / Night
Depth 52 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	41.1	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	2.6	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	942.2	28:1		14	$\Delta^{5,22}C_{27}$	1.5
i 15:0	26.1	28:0	0.7	14	$\Delta^{5}C_{27}$	2.6
a 15:0	9.3	29:0	0.2	14	$\Delta^{5,22}C_{28}$	0.3
15:0	30.2	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	3177.1	30:1		unk		
16:0	3856.3	30:0	1.3	unk		
i 17:0	44.9	31:1		14	$\Delta^{22}C_{29}$	
a 17:0		31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2		15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	1.8	15	$\Delta^{5}C_{27}$	0.7
18:2	87.3	32:0	2.2	16	$\Delta^{5,22}C_{27}$	1.6
18:1Δ^9	3874.8	33:1		16	$\Delta^{5}C_{27}$	5.5
18:1Δ^{11}	955.9	33:0	0.2	14	$\Delta^{5,22}C_{29}$	0.7
18:0	579.3	34:2	2.8	16	$\Delta^{5,22}C_{28}$	1.3
19:0	I.S.	34:1	1.0	16	$\Delta^{5,24(28)}C_{28}$	
20:5	32.5	34:0	1.7	16	$\Delta^{22}C_{28}$	
20:4	7.9	35:0	0.2	16	$\Delta^{5}C_{28}$	
20:1	81.1	36:2	2.0	16	$\Delta^{22}C_{29}$	
20:0	11.7	36:1	1.4	16	$\Delta^{5}C_{29}$	
21:0	101.4	36:0	0.5	17	$\Delta^{5,22}C_{27}$	
22:6	367.4	37:0		17	$\Delta^{5}C_{27}$	1.3
22:5	37.8	38:2		18	$\Delta^{5,22}C_{27}$	2.1
22:1	93.1	38:1		18	$\Delta^{5}C_{27}$	7.8
22:0	10.8	38:0		unk		
23:0	1.9	39:0		18	$\Delta^{5,22}C_{28}$	7.8
24:1	10.4	40:2		18	$\Delta^{5}C_{28}$	
24:0	3.1	40:1	1.4	19	$\Delta^{5}C_{27}$	0.5
25:0	0.3	40:0	0.7	18	$\Delta^{22}C_{29}$(?)	
26:1	0.8	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	11.6	42:2		20	$\Delta^{5,22}C_{27}$	0.7
27:0	8.6	42:1		20	$\Delta^{5}C_{27}$	4.4
28:0	12.6	42:0		22	$\Delta^{5}C_{27}$	0.8
29:0	0.3	44:2		unk		
30:0	0.3	44:1				
		44:0		Total		39.6
Total	14,420.6					
		Total	18.1			

Peru FST 11

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42			
43			
44	20.4		
45			
46	42.0	46e	
47	1.2		
48	73.2	48e	
49	2.4		
50	111.6	50e	
51	7.2		
52	262.8	52e	
53	2.4		
54	154.8	54e	
55			
56	91.2	56e	
57			
58	40.8		
59			
60	33.6		
Total	843.6	Total	N.D.

Peru FST 12

PM Flux - 2.80 g/m^2 12 h
POC Flux - 203.5 mg/m^2 12 h
Lipid Flux - 39.3 mg/m^2 12 hr

Day / Night
Depth 11 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	24.9	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	0.2	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	2597.6	28:1		14	$\Delta^{5,22}C_{27}$	0.5
i 15:0	35.5	28:0	0.6	14	$\Delta^{5}C_{27}$	1.5
a 15:0		29:0	0.2	14	$\Delta^{5,22}C_{28}$	1.3
15:0	59.6	30:2	0.5	14	$\Delta^{22}C_{28}$	1.0
16:1Δ^9	1539.7	30:1	0.8	unk		0.8
16:0	6783.1	30:0	1.2	unk		0.2
i 17:0	21.6	31:1		14	$\Delta^{22}C_{29}$	0.8
a 17:0		31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	1.0	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	1.6	15	$\Delta^{5}C_{27}$	
18:2	46.5	32:0	2.2	16	$\Delta^{5,22}C_{27}$	1.0
18:1Δ^9	1110.8	33:1		16	$\Delta^{5}C_{27}$	2.7
18:1Δ^{11}	164.4	33:0	0.3	14	$\Delta^{5,22}C_{29}$	
18:0	579.7	34:2	6.5	16	$\Delta^{5,22}C_{28}$	5.0
19:0	I.S.	34:1	1.8	16	$\Delta^{5,24(28)}C_{28}$	
20:5	6.8	34:0	1.3	16	$\Delta^{22}C_{28}$	15.5
20:4	18.6	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	20.3	36:2	4.3	16	$\Delta^{22}C_{29}$	3.4
20:0	58.1	36:1	2.1	16	$\Delta^{5}C_{29}$	12.3
21:0		36:0	2.0	17	$\Delta^{5,22}C_{27}$	
22:6	6.9	37:0		17	$\Delta^{5}C_{27}$	
22:5	0.2	38:2		18	$\Delta^{5,22}C_{27}$	
22:1	11.6	38:1	1.5	18	$\Delta^{5}C_{27}$	1.6
22:0	46.3	38:0	1.0	unk		0.8
23:0	4.2	39:0	0.2	18	$\Delta^{5,22}C_{28}$	2.3
24:1	24.8	40:2		18	$\Delta^{5}C_{28}$	3.5
24:0	33.7	40:1	1.0	19	$\Delta^{5}C_{27}$	
25:0	2.0	40:0	0.4	18	$\Delta^{22}C_{29}$(?)	2.4
26:1	5.0	41:0	0.1	18	$\Delta^{5}C_{29}$(?)	1.5
26:0	6.4	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	2.2	42:1	0.8	20	$\Delta^{5}C_{27}$	
28:0	1.7	42:0	0.3	22	$\Delta^{5}C_{27}$	
29:0	1.9	44:2		unk		
30:0	0.9	44:1				
		44:0		Total		58.1
Total	13,215.2					
		Total	32.0			

Peru FST 12

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	18.5		
43	4.4		
44	112.3		
45	14.5		
46	203.3	46e	
47	22.0		
48	248.3	48e	
49	17.2		
50	240.2	50e	
51	14.3		
52	101.4	52e	
53	10.8		
54	89.9	54e	
55	0.7		
56	7.7	56e	
57			
58	5.3		
59			
60			
Total	1110.7	Total	N.D.

Peru FST 13

PM Flux - 3.02 g/m^2 12 h
POC Flux - 165.5 mg/m^2 12 h
Lipid Flux - 24.5 mg/m^2 12 hr

Day / Night
Depth 53 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	14.3	26:1		12	$\Delta^{5,22}C_{28}$	
13:0		26:0	2.2	unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	731.3	28:1		14	$\Delta^{5,22}C_{27}$	0.6
i 15:0	53.0	28:0	2.2	14	$\Delta^{5}C_{27}$	0.6
a 15:0	27.0	29:0	0.1	14	$\Delta^{5,22}C_{28}$	0.9
15:0	80.7	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	878.5	30:1	1.4	unk		
16:0	1882.4	30:0	9.5	unk		0.6
i 17:0	30.9	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	4.5	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	3.4	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	1.9	15	$\Delta^{5}C_{27}$	
18:2	49.5	32:0	10.3	16	$\Delta^{5,22}C_{27}$	1.1
18:1Δ^9	432.6	33:1		16	$\Delta^{5}C_{27}$	2.8
18:1Δ^{11}	202.9	33:0	0.7	14	$\Delta^{5,22}C_{29}$	
18:0	349.0	34:2		16	$\Delta^{5,22}C_{28}$	1.8
19:0	I.S.	34:1	7.0	16	$\Delta^{5,24(28)}C_{28}$	
20:5	110.5	34:0	3.2	16	$\Delta^{22}C_{28}$	3.9
20:4	2.7	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	89.5	36:2	0.8	16	$\Delta^{22}C_{29}$	1.5
20:0	89.9	36:1	1.1	16	$\Delta^{5}C_{29}$	3.7
21:0		36:0	0.7	17	$\Delta^{5,22}C_{27}$	
22:6	237.8	37:0	0.2	17	$\Delta^{5}C_{27}$	
22:5	12.1	38:2		18	$\Delta^{5,22}C_{27}$	
22:1	15.9	38:1	3.0	18	$\Delta^{5}C_{27}$	1.1
22:0	44.8	38:0	0.1	unk		
23:0	9.3	39:0	0.2	18	$\Delta^{5,22}C_{28}$	0.7
24:1	55.6	40:2		18	$\Delta^{5}C_{28}$	
24:0	61.7	40:1	1.0	19	$\Delta^{5}C_{27}$	
25:0	6.0	40:0	0.4	18	$\Delta^{22}C_{29}$(?)	0.3
26:1	18.2	41:0		18	$\Delta^{5}C_{29}$(?)	0.5
26:0	21.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	8.0	42:1	0.3	20	$\Delta^{5}C_{27}$	
28:0	8.0	42:0	0.4	22	$\Delta^{5}C_{27}$	
29:0	5.0	44:2		unk		
30:0	2.6	44:1				
		44:0		Total		20.1
Total	5535.8					
		Total	48.4			

Peru FST 13

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	5.5		
43	1.3		
44	19.1		
45	3.2		
46	61.0	46e	
47	4.6		
48	65.6	48e	
49	2.6		
50	43.2	50e	
51	3.1		
52	32.4	52e	
53	2.0		
54	18.1	54e	
55			
56	4.3	56e	
57			
58			
59			
60			
Total	266.2	Total	N.D.

Peru FST 14

PM Flux - 3.61 g/m^2 12 h
POC Flux - 343.2 mg/m^2 12 h
Lipid Flux - 117.2 mg/m^2 12 hr

Day / Night
Depth 11 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	97.9	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	2.8	26:0	0.7	unk		
14:1		27:0	0.2	13	$\Delta^{5,22}C_{28}$	
14:0	2636.7	28:1	0.8	14	$\Delta^{5,22}C_{27}$	1.2
i 15:0	130.7	28:0	6.5	14	$\Delta^{5}C_{27}$	4.8
a 15:0	6.4	29:0	1.0	14	$\Delta^{5,22}C_{28}$	0.3
15:0	220.0	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	921.5	30:1	8.5	unk		
16:0	10,952.8	30:0	25.4	unk		
i 17:0	66.3	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	46.8	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	7.2	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	13.8	15	$\Delta^{5}C_{27}$	0.9
18:2		32:0	26.6	16	$\Delta^{5,22}C_{27}$	3.4
18:1Δ^9	2041.1	33:1		16	$\Delta^{5}C_{27}$	15.1
18:1Δ^{11}	584.2	33:0	1.7	14	$\Delta^{5,22}C_{29}$	
18:0	1415.0	34:2	11.2	16	$\Delta^{5,22}C_{28}$	0.1
19:0	I.S.	34:1	21.8	16	$\Delta^{5,24(28)}C_{28}$	
20:5	4.7	34:0	5.6	16	$\Delta^{22}C_{28}$	
20:4	27.7	35:0	0.6	16	$\Delta^{5}C_{28}$	
20:1	465.9	36:2	0.6	16	$\Delta^{22}C_{29}$	
20:0	297.9	36:1	4.0	16	$\Delta^{5}C_{29}$	0.2
21:0		36:0	0.7	17	$\Delta^{5,22}C_{27}$	
22:6	35.8	37:0	0.6	17	$\Delta^{5}C_{27}$	1.1
22:5	6.3	38:2	2.9	18	$\Delta^{5,22}C_{27}$	4.2
22:1	52.1	38:1	4.2	18	$\Delta^{5}C_{27}$	19.8
22:0	158.2	38:0	0.3	unk		
23:0	35.7	39:0	0.1	18	$\Delta^{5,22}C_{28}$	
24:1	160.7	40:2	0.7	18	$\Delta^{5}C_{28}$	
24:0	129.7	40:1	1.5	19	$\Delta^{5}C_{27}$	0.4
25:0	5.9	40:0	0.1	18	$\Delta^{22}C_{29}$(?)	
26:1	22.4	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	17.5	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	44.3	42:1	0.7	20	$\Delta^{5}C_{27}$	1.1
28:0	4.6	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.7	44:2		unk		
30:0	0.7	44:1				
		44:0		Total		52.6
Total	20,575.0					
		Total	148.0			

Peru FST 14

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	4.9		
41			
42	31.3		
43	6.8		
44	112.1		
45	11.8		
46	220.8	46e	
47			
48	230.4	48e	17.8
49			
50	124.8	50e	53.5
51			
52	68.3	52e	42.7
53			
54	30.1	54e	20.2
55	6.6		
56	17.3	56e	9.4
57			
58	3.7		
59			
60			
Total	868.9	Total	143.5

Peru FST 15

PM Flux - 2.32 g/m^2 12 h
POC Flux - 73.2 mg/m^2 12 h
Lipid Flux - 12.1 mg/m^2 12 hr

Day / Night
Depth 53 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	8.0	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	0.5	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	505.1	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	19.7	28:0	2.0	14	$\Delta^{5}C_{27}$	1.0
a 15:0	11.9	29:0	0.1	14	$\Delta^{5,22}C_{28}$	
15:0	37.1	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	1077.3	30:1	0.6	unk		
16:0	665.4	30:0	3.2	unk		
i 17:0	39.1	31:1		14	$\Delta^{22}C_{29}$	
a 17:0		31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	1.9	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	1.4	15	$\Delta^{5}C_{27}$	
18:2	44.7	32:0	3.9	16	$\Delta^{5,22}C_{27}$	0.3
18:1Δ^9	311.2	33:1		16	$\Delta^{5}C_{27}$	0.8
18:1Δ^{11}	165.4	33:0	0.2	14	$\Delta^{5,22}C_{29}$	0.8
18:0	153.2	34:2		16	$\Delta^{5,22}C_{28}$	1.0
19:0	I.S.	34:1	6.5	16	$\Delta^{5,24(28)}C_{28}$	
20:5	230.9	34:0	1.4	16	$\Delta^{22}C_{28}$	
20:4	5.3	35:0	0.2	16	$\Delta^{5}C_{28}$	
20:1	8.5	36:2		16	$\Delta^{22}C_{29}$	
20:0	6.2	36:1	1.6	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.7	17	$\Delta^{5,22}C_{27}$	
22:6	103.7	37:0	0.2	17	$\Delta^{5}C_{27}$	
22:5	5.2	38:2	0.5	18	$\Delta^{5,22}C_{27}$	0.5
22:1	46.5	38:1	0.4	18	$\Delta^{5}C_{27}$	1.2
22:0	44.9	38:0		unk		
23:0	3.4	39:0	0.1	18	$\Delta^{5,22}C_{28}$	0.3
24:1	23.7	40:2		18	$\Delta^{5}C_{28}$	
24:0	20.9	40:1	0.5	19	$\Delta^{5}C_{27}$	
25:0	2.8	40:0		18	$\Delta^{22}C_{29}$(?)	
26:1	6.4	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	6.7	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	1.7	42:1		20	$\Delta^{5}C_{27}$	
28:0	2.2	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.5	44:2		unk		
30:0	0.5	44:1				
		44:0		Total		5.9
Total	3558.6					
		Total	25.4			

Peru FST 15

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	2.6		
41			
42	8.5		
43	0.8		
44	72.7		
45	7.2		
46	195.6	46e	
47	11.0		
48	202.8	48e	
49	2.4		
50	81.8	50e	
51	4.8		
52	122.4	52e	
53	2.0		
54	69.6	54e	
55	2.3		
56	40.1	56e	
57			
58	17.9		
59			
60			
Total	844.7	Total	N.D.

Peru FST 16

PM Flux - 4.23 g/m^2 12 h
POC Flux - 224.4 mg/m^2 12 h
Lipid Flux - 80.6 mg/m^2 12 hr

Day / Night
Depth 11 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	202.0	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	1.0	26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	4619.4	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	104.1	28:0	13.1	14	$\Delta^{5}C_{27}$	0.5
a 15:0	22.9	29:0	1.5	14	$\Delta^{5,22}C_{28}$	
15:0	298.5	30:2		14	$\Delta^{22}C_{28}$	0.9
16:1Δ^9	4949.6	30:1	10.7	unk		
16:0	14,168.0	30:0	26.2	unk		1.1
i 17:0	145.7	31:1		14	$\Delta^{22}C_{29}$	0.6
a 17:0	59.5	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	3.0	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	11.0	15	$\Delta^{5}C_{27}$	
18:2	169.0	32:0	17.4	16	$\Delta^{5,22}C_{27}$	2.0
18:1Δ^9	1306.3	33:1		16	$\Delta^{5}C_{27}$	1.7
18:1Δ^{11}	588.2	33:0	1.1	14	$\Delta^{5,22}C_{29}$	
18:0	1771.4	34:2	20.9	16	$\Delta^{5,22}C_{28}$	3.9
19:0	I.S.	34:1	3.4	16	$\Delta^{5,24(28)}C_{28}$	
20:5	385.4	34:0	3.4	16	$\Delta^{22}C_{28}$	4.1
20:4	39.2	35:0	0.7	16	$\Delta^{5}C_{28}$	
20:1	362.2	36:2	3.5	16	$\Delta^{22}C_{29}$	2.6
20:0	705.7	36:1	5.2	16	$\Delta^{5}C_{29}$	6.6
21:0		36:0	2.2	17	$\Delta^{5,22}C_{27}$	
22:6	402.0	37:0	0.4	17	$\Delta^{5}C_{27}$	
22:5	4.9	38:2	2.1	18	$\Delta^{5,22}C_{27}$	
22:1	212.7	38:1	2.5	18	$\Delta^{5}C_{27}$	0.6
22:0	411.0	38:0	1.2	unk		
23:0	39.4	39:0	0.4	18	$\Delta^{5,22}C_{28}$	0.8
24:1	78.4	40:2		18	$\Delta^{5}C_{28}$	0.5
24:0	239.8	40:1	2.3	19	$\Delta^{5}C_{27}$	
25:0	11.8	40:0	0.2	18	$\Delta^{22}C_{29}$(?)	0.6
26:1	28.7	41:0		18	$\Delta^{5}C_{29}$(?)	1.3
26:0	42.9	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	2.5	42:1		20	$\Delta^{5}C_{27}$	
28:0	8.8	42:0		22	$\Delta^{5}C_{27}$	
29:0	3.5	44:2		unk		
30:0	6.5	44:1				
		44:0		Total		27.8
Total	31,382.0					
		Total	132.4			

Peru FST 16

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	9.8		
41			
42	14.0		
43	4.2		
44	31.4		
45	6.0		
46	54.0	46e	
47	10.4		
48	59.3	48e	
49	10.6		
50	38.6	50e	
51	3.0		
52	33.7	52e	
53	2.8		
54	24.7	54e	
55			
56	5.6	56e	
57			
58			
59			
60			
Total	308.3	Total	N.D.

Peru FST 17

PM Flux - 3.12 g/m^2 12 h
POC Flux - 208.8 mg/m^2 12 h
Lipid Flux - 23.0 mg/m^2 12 hr

Day / Night
Depth 53 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	1.4	26:1		12	$\Delta^{5,22}C_{28}$	
13:0		26:0		unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	386.6	28:1		14	$\Delta^{5,22}C_{27}$	
i 15:0	15.3	28:0	0.9	14	$\Delta^{5}C_{27}$	0.2
a 15:0	0.9	29:0	0.4	14	$\Delta^{5,22}C_{28}$	
15:0	12.7	30:2	1.3	14	$\Delta^{22}C_{28}$	
16:1Δ^9	380.8	30:1	1.8	unk		
16:0	1964.9	30:0	1.4	unk		
i 17:0	11.1	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	2.1	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	1.1	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	0.6	15	$\Delta^{5}C_{27}$	
18:2		32:0	1.6	16	$\Delta^{5,22}C_{27}$	0.8
18:1Δ^9	173.5	33:1		16	$\Delta^{5}C_{27}$	0.7
18:1Δ^{11}	137.8	33:0	0.2	14	$\Delta^{5,22}C_{29}$	
18:0	371.4	34:2		16	$\Delta^{5,22}C_{28}$	
19:0	I.S.	34:1	1.9	16	$\Delta^{5,24(28)}C_{28}$	
20:5	1.7	34:0	0.5	16	$\Delta^{22}C_{28}$	
20:4		35:0		16	$\Delta^{5}C_{28}$	
20:1	5.6	36:2		16	$\Delta^{22}C_{29}$	
20:0	13.2	36:1	1.1	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.1	17	$\Delta^{5,22}C_{27}$	
22:6	2.4	37:0		17	$\Delta^{5}C_{27}$	
22:5	1.4	38:2		18	$\Delta^{5,22}C_{27}$	0.6
22:1	2.8	38:1	0.9	18	$\Delta^{5}C_{27}$	0.6
22:0	17.3	38:0		unk		
23:0	2.1	39:0		18	$\Delta^{5,22}C_{28}$	
24:1	2.3	40:2		18	$\Delta^{5}C_{28}$	
24:0	12.2	40:1		19	$\Delta^{5}C_{27}$	
25:0	1.4	40:0		18	$\Delta^{22}C_{29}$(?)	
26:1	1.5	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	4.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	0.4	42:1		20	$\Delta^{5}C_{27}$	
28:0	1.1	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.1	44:2		unk		
30:0	0.1	44:1				
		44:0		Total		2.9
Total	3528.7					
		Total	13.8			

Peru FST 17

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	10.9		
43	1.3		
44	19.8		
45	5.3		
46	36.1	46e	
47	5.0		
48	47.8	48e	
49	4.6		
50	38.2	50e	
51	2.5		
52	45.1	52e	
53			
54	41.0	54e	
55			
56		56e	
57			
58			
59			
60			
Total	257.6	Total	N.D.

Peru FST 18

PM Flux - 4.58 g/m^2 12 h
POC Flux - 350.4 mg/m^2 12 h
Lipid Flux - 53.7 mg/m^2 12 hr

Day / Night
Depth 11 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	39.5	26:1		12	$\Delta^{5,22}C_{28}$	
13:0		26:0	2.0	unk		
14:1		27:0	0.4	13	$\Delta^{5,22}C_{28}$	
14:0	1830.0	28:1		14	$\Delta^{5,22}C_{27}$	0.1
i 15:0	85.6	28:0	23.5	14	$\Delta^{5}C_{27}$	0.7
a 15:0	13.3	29:0	3.1	14	$\Delta^{5,22}C_{28}$	
15:0	99.6	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	1533.8	30:1	8.7	unk		
16:0	7194.1	30:0	68.7	unk		
i 17:0	38.9	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	46.7	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	9.2	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	12.5	15	$\Delta^{5}C_{27}$	0.3
18:2	113.4	32:0	44.0	16	$\Delta^{5,22}C_{27}$	1.0
18:1Δ^9	1140.5	33:1		16	$\Delta^{5}C_{27}$	4.9
18:1Δ^{11}	472.1	33:0	2.2	14	$\Delta^{5,22}C_{29}$	
18:0	940.3	34:2	6.4	16	$\Delta^{5,22}C_{28}$	1.8
19:0	I.S.	34:1	19.8	16	$\Delta^{5,24(28)}C_{28}$	
20:5	58.4	34:0	6.6	16	$\Delta^{22}C_{28}$	
20:4	11.4	35:0	0.6	16	$\Delta^{5}C_{28}$	
20:1	259.8	36:2	7.9	16	$\Delta^{22}C_{29}$	
20:0	149.2	36:1	7.4	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.4	17	$\Delta^{5,22}C_{27}$	
22:6	49.1	37:0	0.5	17	$\Delta^{5}C_{27}$	0.5
22:5	0.8	38:2		18	$\Delta^{5,22}C_{27}$	0.9
22:1	49.7	38:1	2.8	18	$\Delta^{5}C_{27}$	7.4
22:0	91.4	38:0	0.6	unk		
23:0	18.8	39:0	0.5	18	$\Delta^{5,22}C_{28}$	0.4
24:1	51.2	40:2		18	$\Delta^{5}C_{28}$	
24:0	57.9	40:1	1.6	19	$\Delta^{5}C_{27}$	
25:0	2.1	40:0		18	$\Delta^{22}C_{29}$(?)	
26:1	16.8	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	3.8	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	1.3	42:1	0.9	20	$\Delta^{5}C_{27}$	1.1
28:0	1.6	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.8	44:2		unk		
30:0	0.8	44:1				
		44:0		Total		19.1
Total	14,372.7					
		Total	229.7			

Peru FST 18

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	7.4		
41	0.5		
42	20.0		
43	4.0		
44	56.2		
45	9.2		
46	112.4	46e	
47			
48	129.6	48e	9.2
49			
50	89.2	50e	20.2
51			
52	52.1	52e	26.0
53			
54	34.4	54e	24.6
55			
56	9.7	56e	10.4
57			
58		58e	4.8
59			
60			
Total	524.7	Total	95.3

Peru FST 19

PM Flux - 2.50 g/m^2 12 h
POC Flux - 111.6 mg/m^2 12 h
Lipid Flux - 6.7 mg/m^2 12 hr

Day / Night
Depth 53 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	1.2	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	0.5	26:0	0.1	unk		
14:1		27:0		13	$\Delta^{5,22}C_{28}$	
14:0	237.8	28:1		14	$\Delta^{5,22}C_{27}$	0.3
i 15:0	16.2	28:0	1.4	14	$\Delta^{5}C_{27}$	0.3
a 15:0	0.7	29:0	0.3	14	$\Delta^{5,22}C_{28}$	
15:0	13.2	30:2		14	$\Delta^{22}C_{28}$	1.0
16:1Δ^9	122.9	30:1	0.9	unk		
16:0	1033.1	30:0	3.6	unk		0.5
i 17:0	7.2	31:1		14	$\Delta^{22}C_{29}$	0.4
a 17:0	1.7	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2	1.6	15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	1.2	15	$\Delta^{5}C_{27}$	
18:2		32:0	4.2	16	$\Delta^{5,22}C_{27}$	0.5
18:1Δ^9	228.9	33:1		16	$\Delta^{5}C_{27}$	0.8
18:1Δ^{11}	79.7	33:0	0.3	14	$\Delta^{5,22}C_{29}$	
18:0	152.4	34:2		16	$\Delta^{5,22}C_{28}$	3.2
19:0	I.S.	34:1	11.2	16	$\Delta^{5,24(28)}C_{28}$	
20:5		34:0	0.8	16	$\Delta^{22}C_{28}$	3.6
20:4		35:0	0.1	16	$\Delta^{5}C_{28}$	
20:1	10.9	36:2	1.2	16	$\Delta^{22}C_{29}$	1.1
20:0	10.2	36:1	2.6	16	$\Delta^{5}C_{29}$	2.4
21:0		36:0	0.4	17	$\Delta^{5,22}C_{27}$	
22:6	2.1	37:0	0.1	17	$\Delta^{5}C_{27}$	
22:5		38:2		18	$\Delta^{5,22}C_{27}$	
22:1		38:1	1.4	18	$\Delta^{5}C_{27}$	0.2
22:0	8.4	38:0	0.04	unk		0.5
23:0	0.8	39:0	0.1	18	$\Delta^{5,22}C_{28}$	0.3
24:1	5.4	40:2		18	$\Delta^{5}C_{28}$	0.2
24:0	6.1	40:1	0.6	19	$\Delta^{5}C_{27}$	
25:0	0.6	40:0	0.1	18	$\Delta^{22}C_{29}$(?)	0.3
26:1	1.4	41:0		18	$\Delta^{5}C_{29}$(?)	0.1
26:0	1.6	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	2.3	42:1	0.3	20	$\Delta^{5}C_{27}$	
28:0	0.4	42:0		22	$\Delta^{5}C_{27}$	
29:0	0.1	44:2		unk		0.2
30:0	0.1	44:1				
		44:0		Total		15.9
Total	1949.9					
		Total	32.4			

Peru FST 19

Triacylglycerols		Alkyldiacylglycerols	
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h
40			
41			
42	9.7		
43	1.9		
44	35.5		
45	8.6		
46	75.2	46e	
47	7.9		
48	117.8	48e	
49	5.5		
50	102.0	50e	11.3
51	2.6		
52	43.4	52e	14.4
53	1.8		
54	37.0	54e	11.5
55	1.0		
56	5.8	56e	2.6
57			
58	2.2	58e	
59			
60			
Total	457.8	Total	39.8

Peru FST 20

PM Flux - 2.86 g/m^2 12 h
POC Flux - 208.2 mg/m^2 12 h
Lipid Flux - 17.9 mg/m^2 12 hr

Day / Night
Depth 36 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	16.7	26:1		12	$\Delta^{5,22}C_{28}$	5.2
13:0	1.0	26:0	0.9	unk		1.8
14:1		27:0	0.7	13	$\Delta^{5,22}C_{28}$	7.9
14:0	563.0	28:1		14	$\Delta^{5,22}C_{27}$	9.8
i 15:0	90.4	28:0	5.7	14	$\Delta^{5}C_{27}$	7.3
a 15:0	16.9	29:0	2.5	14	$\Delta^{5,22}C_{28}$	44.5
15:0	50.8	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	182.0	30:1		unk		
16:0	2914.9	30:0	17.1	unk		
i 17:0	24.3	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	8.0	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	11.9
17:1		32:2	18.2	15	$\Delta^{5}C_{28}$	5.7
17:0	I.S.	32:1	8.3	15	$\Delta^{5}C_{27}$	
18:2		32:0	50.9	16	$\Delta^{5,22}C_{27}$	6.8
18:1Δ^9	444.3	33:1		16	$\Delta^{5}C_{27}$	10.0
18:1Δ^{11}	86.3	33:0	2.4	14	$\Delta^{5,22}C_{29}$	
18:0	387.2	34:2		16	$\Delta^{5,22}C_{28}$	20.6
19:0	I.S.	34:1	81.0	16	$\Delta^{5,24(28)}C_{28}$	
20:5	3.4	34:0	5.5	16	$\Delta^{22}C_{28}$	19.8
20:4		35:0	0.7	16	$\Delta^{5}C_{28}$	36.2
20:1	42.6	36:2		16	$\Delta^{22}C_{29}$	12.7
20:0	74.0	36:1	14.1	16	$\Delta^{5}C_{29}$	
21:0		36:0	4.2	17	$\Delta^{5,22}C_{27}$	
22:6	2.3	37:0		17	$\Delta^{5}C_{27}$	
22:5	0.4	38:2		18	$\Delta^{5,22}C_{27}$	
22:1	17.1	38:1	6.4	18	$\Delta^{5}C_{27}$	30.7
22:0	42.5	38:0	7.7	unk		1.5
23:0	6.2	39:0		18	$\Delta^{5,22}C_{28}$	13.7
24:1	22.8	40:2		18	$\Delta^{5}C_{28}$	
24:0	36.9	40:1	3.6	19	$\Delta^{5}C_{27}$	
25:0	4.3	40:0	1.3	18	$\Delta^{22}C_{29}$(?)	
26:1	14.8	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	0.4	42:2		20	$\Delta^{5,22}C_{27}$	3.7
27:0	1.9	42:1		20	$\Delta^{5}C_{27}$	3.9
28:0	5.7	42:0		22	$\Delta^{5}C_{27}$	
29:0		44:2		unk		2.4
30:0	1.7	44:1				
		44:0		Total		256.1
Total	5062.8					
		Total	231.2			

Peru FST 20

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40			
41			
42	9.8		
43			
44	18.2		
45	1.8		
46	50.4	46e	
47	3.2		
48	63.6	48e	
49	5.5		
50	52.6	50e	
51			
52	20.5	52e	
53			
54	25.2	54e	
55			
56		56e	
57			
58		58e	
59			
60			
Total	250.9	Total	N.D.

Peru FST 21

PM Flux - 2.79 g/m^2 12 h
POC Flux - 66 mg/m^2 12 h
Lipid Flux - 60 mg/m^2 12 hr

Day / Night
Depth 53 m

Total Fatty Acids		Wax Esters		Steryl Esters		
C No.	µg/m^2 12 h	C No.	µg/m^2 12 h	C No.		µg/m^2 12 h
				acyl	sterol	
12:0	444.3	26:1		12	$\Delta^{5,22}C_{28}$	
13:0	1.5	26:0	1.4	unk		
14:1		27:0	0.5	13	$\Delta^{5,22}C_{28}$	
14:0	1895.0	28:1		14	$\Delta^{5,22}C_{27}$	0.7
i 15:0	134.1	28:0	3.2	14	$\Delta^{5}C_{27}$	1.5
a 15:0	34.0	29:0	0.5	14	$\Delta^{5,22}C_{28}$	0.6
15:0	158.2	30:2		14	$\Delta^{22}C_{28}$	
16:1Δ^9	2015.8	30:1	0.5	unk		
16:0	6318.0	30:0	4.2	unk		
i 17:0	1258.1	31:1		14	$\Delta^{22}C_{29}$	
a 17:0	232.2	31:0	I.S.	15	$\Delta^{5,22}C_{28}$	
17:1		32:2		15	$\Delta^{5}C_{28}$	
17:0	I.S.	32:1	8.1	15	$\Delta^{5}C_{27}$	0.5
18:2	154.3	32:0	5.2	16	$\Delta^{5,22}C_{27}$	0.7
18:1Δ^9	1099.1	33:1		16	$\Delta^{5}C_{27}$	4.0
18:1Δ^{11}	729.6	33:0	1.0	14	$\Delta^{5,22}C_{29}$	1.0
18:0	1509.2	34:2		16	$\Delta^{5,22}C_{28}$	1.2
19:0	I.S.	34:1	13.0	16	$\Delta^{5,24(28)}C_{28}$	
20:5	44.2	34:0	2.4	16	$\Delta^{22}C_{28}$	
20:4	2.2	35:0	0.3	16	$\Delta^{5}C_{28}$	
20:1	415.7	36:2		16	$\Delta^{22}C_{29}$	
20:0	198.8	36:1	4.5	16	$\Delta^{5}C_{29}$	
21:0		36:0	0.6	17	$\Delta^{5,22}C_{27}$	
22:6	103.1	37:0	0.7	17	$\Delta^{5}C_{27}$	0.3
22:5	1.5	38:2		18	$\Delta^{5,22}C_{27}$	1.1
22:1	88.3	38:1	3.3	18	$\Delta^{5}C_{27}$	4.3
22:0	140.9	38:0		unk		
23:0	28.5	39:0	1.0	18	$\Delta^{5,22}C_{28}$	0.6
24:1	69.9	40:2		18	$\Delta^{5}C_{28}$	
24:0	122.6	40:1		19	$\Delta^{5}C_{27}$	
25:0	61.7	40:0	0.9	18	$\Delta^{22}C_{29}$(?)	
26:1	28.6	41:0		18	$\Delta^{5}C_{29}$(?)	
26:0	49.1	42:2		20	$\Delta^{5,22}C_{27}$	
27:0	28.6	42:1		20	$\Delta^{5}C_{27}$	1.5
28:0	18.7	42:0		22	$\Delta^{5}C_{27}$	
29:0		44:2		unk		
30:0		44:1				
		44:0		Total		18.0
Total	17,385.8					
		Total	51.3			

Peru FST 21

Triacylglycerols		Alkyldiacylglycerols	
C No.	$\mu g/m^2$ 12 h	C No.	$\mu g/m^2$ 12 h
40	9.7		
41			
42	17.6		
43			
44	34.6		
45	3.5		
46	66.6	46e	
47	6.6		
48	126.0	48e	
49	8.3		
50	99.4	50e	
51	7.2		
52	116.4	52e	
53			
54	86.5	54e	
55			
56		56e	
57			
58		58e	
59			
60			
Total	582.4	Total	N.D.

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